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## Hand-Held Sonar

**Description.** The Hydroacoustic Systems Laboratory of the Technical University of Gdansk, Poland, has developed a simple, inexpensive hand-held sonar. Named "KRAB," it was originally designed for use by military divers to locate underwater mines. However, they soon discovered that it also is effective for detecting human bodies, both alive and dead. Two versions are produced: (1) completely submersible (to 40 meters) for use by divers, and (2) rainproof, with the transducer on a foldable 1.3 meter long stick for use from a pier, rowboat, etc.

**Operating Principles.** The sonar transmits a series of frequency modulated (FM) signals continuously varying from 132.5 to 147.5 KHz. The echo from an object is heterodyned (mixed) with a sample of the signal being transmitted, producing a "beat" frequency equal to the FM frequency sweep rate times the acoustic two-way travel time. The FM frequency sweep rate is selected such that this "beat" frequency will be an audible tone for a target within the selected range scale. Thus, object detection is by the sound heard in the earphones, range being proportional to the sound's pitch. Direction is simply where it is pointing. Even though the acoustic beamwidth is 20 degrees, an object can be located to within just a few degrees simply by moving the device right and left (and/or up and down) and noting how the signal strength varies.

### Specifications.

Operating frequency	140 KHz
FM frequency sweep	+/- 7.5 KHz
Beamwidth	20 degrees
Range scales	20 and 100 meters
Maximum depth (divers version)	40 meters
Length of stick (surface version)	1.3 meters

Power supply ..... 12 volt rechargeable battery  
Cost ..... \$650.00 (approximate)

For further information, contact:

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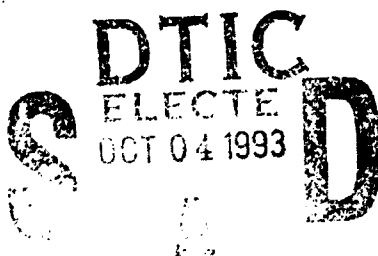
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